

thither from Madrid for my own observations with the Ebert electrometer, the Brashear polarimeter, and the mercury actinometer.

At Zaragoza I placed the work in charge of Prof. José Blanco, S. J., at the Colegio del Salvador, in an excellent location.

At Guadalajara I was fortunate enough to secure the assistance of Lieut. Col. Vivez y Vich, the Director of the Military Aerostatic Service of Spain, who already has a meteorological station there. He showed me his large balloons intended for the eclipse ascensions at Burgos, for the International Commission, also his homing pigeons, and the various valuable works he is conducting.

At Madrid I called upon the director of the observatory, who gives the time signals to all astronomers for longitude, etc., and left with him my last package of circulars on the shadow bands.

I return to Daroca to-morrow and shall remain there until September 1, when we return to Valencia. The ships all meet at Nice on September 5 or 6 and sail for home September 13. I have heard nothing from Doctor Hanzlik about the African stations.

#### METEOROLOGY IN PETERMANN'S GEOGRAPHISCHE MITTHEILUNGEN.

Since the eminent climatologist, Prof. Dr. A. Supan, became the editor of Petermann's Mitteilungen that important geographical journal has devoted an increased attention to meteorology. Not only have occasional special articles of importance appeared therein, but we have in mind particularly the reviews of meteorological publications and the invaluable indexes to local climatological data as arranged by countries and stations. These reviews and indexes constitute the "Geographischer Literaturbericht," or systematic review of geographical literature, which occupies quite as large a space as the mitteilungen themselves. Thus, in the fiftieth volume, for 1904, we have 298 pages of the latter and 226 pages of the reviews and indexes, besides 21 large charts. In these climatological indexes special attention is paid to records of observed rainfall. Number 14 is a number that is retained throughout volume No. 50 for what are called local climatological contributions in which references to numerical data are arranged by countries and stations, and this is followed by other reviews bearing on pressure, moisture, glaciation, change of climate, and terrestrial magnetism. The separate reviews are numbered, the last number being 799.

In the current volume for 1905 the opening article by Nansen on the "Causes that produce ocean currents" is a clear and popular presentation of the various theories that have been advanced on this matter, but we see no mention of Professor Ferrel's explanation of the Gulf Stream, although Nansen's presentation of the subject is closely analogous to that of Ferrel in his Recent Advances, Chapter VII, and elsewhere.

The local climatological contributions constitute No. 34 of these reviews for 1905 and occupy six closely printed pages, followed by a series of perhaps ten pages of reviews of recent publications on the rainfall, and especially on the circulation of the atmosphere. There is a very appreciative notice of the work of Dr. O. L. Fassig on kite-flying in the Tropics by Dr. R. Süring of the Meteorological Office in Berlin. There are also elaborate reviews of the various publications that have appeared in the MONTHLY WEATHER REVIEW from Professors Bigelow, Dewar, Shaw, Algué, and others.

In the Mitteilungen for March 28, 1905, we find a note by Supan on the kite work over the ocean, especially that by Hergesell over the Atlantic Ocean for the Prince of Monaco. With regard to the ascension made on August 9, 1904, west of the Canary Islands, and therefore far removed from all continental influences, he says:

We may assume the conditions there found as typical for the whole region between Portugal, the Canaries, and the Azores, except in the immediate vicinity of the latter. As the kite ascended the thermograph record shows that the temperature fell adiabatically up to about 500 meters, then rose rapidly up to about 1100 meters, where it was warmer than at the earth's surface, and whence it steadily fell up to 5000 meters. The warm and dry intermediate layer, the gradual shifting of the wind from northeast to northwest by west, and the complete failure of the

southwest trade winds at the altitude where it always prevails on Teneriffe led the Prince of Monaco to consider this as a very local phenomenon.

On the other hand Supan considers that:

These kite observations were not made in the region of well developed trade winds, but within the subtropical zone of high pressure. The distribution of temperature and moisture seems to suggest that the movement of the air diminishes with altitude, even in the Bahamas. Mr. Fassig's work was done outside of the region of the maximum trades and he found no inversion of temperature, but a steady adiabatic diminution. We shall not be able to draw any theoretical conclusions until we have a section through the atmosphere over the whole North Atlantic.

On pages 81-90, and 108-115, Dr. Jacob Hoffman gives an exhaustive review of our knowledge of the temperatures on the highlands of tropical Africa, south of the equator. As the records from every available station and traveler are quoted we can not summarize this paper which goes into the details of the influence of insolation, nocturnal radiation, the wind, the cloudiness, and the presence of oceans and lakes. The reader will be amazed to perceive how much has been recorded relative to African meteorology.

On page 91 we have a list of the courses of lectures on geography in German universities during the summer of 1905. As meteorology and climatology are generally included under geography, we give the following items relating thereto:

#### METEOROLOGY IN GERMAN UNIVERSITIES AND TECHNICAL SCHOOLS.

*Aix-la-Chapelle.*—Technical High School. Doctor Polis; two hours weekly on climatology.

*Berlin.*—The University. Doctor Philippi; one hour weekly on the climate of geological epochs. Prof. Dr. von Bezold; two hours weekly on theoretical meteorology or thermodynamics of the atmosphere. Technical High School.—Doctor Kassner; one hour weekly on precipitation with special reference to technology.

*Bonn.*—The University. No meteorology.

*Brunswick.*—Technical High School. Professor Koppe; two hours weekly on barometric hypsometry.

*Breslau.*—The University. No meteorology.

*Dantzic.*—Technical High School. No meteorology.

*Darmstadt.*—Technical High School. No meteorology.

*Dresden.*—Technical High School. No meteorology.

*Erlangen.*—The University. No meteorology.

*Freiburg in Baden.*—The University. No meteorology.

*Giessen.*—University. No meteorology.

*Göttingen.*—University. Professor Wagner; general climatology, four hours weekly. Professor Wiechert; meteorology, two hours weekly.

*Greifswald.*—University. Professor Credner; elements of climatology. Professor Holtz; one hour weekly in meteorology, including its optical phenomena treated popularly with experiments. Professor Deecke; on glaciers and the glacial epoch.

*Halle in Saxony.*—The University.—No meteorology.

*Hanover.*—Technical High School.—No meteorology.

*Heidelberg.*—The University. Professor Wolf; two hours weekly on meteorology.

*Jena.*—The University. No meteorology.

*Carlsruhe.*—Technical High School. No meteorology.

*Kiel.*—The University. No meteorology.

*Königsberg in Prussia.*—The University. No meteorology.

*Leipsic.*—The University. No meteorology.

*Marburg in Hesse.*—The University. No meteorology.

*Munich.*—The University. No meteorology. Technical High School. No meteorology.

*Münster in Württemberg.*—University. No meteorology.

*Rostock.*—University. No meteorology.

*Strassburg in Alsace.*—University. Professor Hergesell; selected chapters in modern meteorology treated by the semi-nary method, two hours weekly.

*Stuttgart.*—Technical High School. No meteorology.

*Tubingen.*—The University. No meteorology.

*Würzburg.*—University. No meteorology.

#### AUSTRIA.

*Czernowitz.*—The University. No meteorology.

*Graz.*—The University. Professor Bendof; meteorology, three hours a week. Technical High School. No meteorology.

*Innsbruck.*—University. Professor Trabert; weather and climate, three hours weekly; the föhn, one hour weekly.

*Prague.*—German University. Professor Spittaler. Practical meteorology, viz, instruments, observations, and computations, three hours weekly. German Technical High School. No meteorology.

*Vienna.*—The University. Professor Hann; introduction to the computation and reduction of meteorological and climatological observations two hours weekly. Professor Pernter; meteorology, viz, three hours a week on the theory of instruments and practise in observing and computations at the Central Institute for Meteorology. Doctor Valentin; on barometric hypsometry, one hour a week. Technical High School. No meteorology.

#### SWITZERLAND.

*Basle.*—No meteorology.

*Berne.*—University. No meteorology.

*Zurich.*—University. Professor Stoll; the atmosphere and the hydrosphere. Polytechnicum. No meteorology.

Out of 44 universities and technical schools using the German language 13 recognize meteorology as worthy of special mention.

In the *Mitteilungen* for May, 1905, page 118, Doctor von Lendenfeld, of Prague, gives the result of a study of the hot winds in Melbourne.

*The hot winds of Melbourne.*—These hot winds come from the north and occur throughout the summer of the Southern Hemisphere. They may last from a few hours to three days, increasing steadily in warmth and velocity until they reach 40° to 44°C. and 60 or 80 kilometers per hour. They end with the sudden formation of thunderstorms; and the wind swings around to the south and the temperature may fall to 22°C., in the first hour. They occur on the front of a region of low pressure which moves from west to east, and their severity increases in proportion as the center of low pressure approaches the city of Melbourne. The sudden shift of wind and fall of temperature occurs at the moment when the center of the pressure passes the meridian of Melbourne. This hot wind comes from the interior of Australia; it passes over the southwest portion of the Australian Alps, lying north of Melbourne at an altitude of about 700 meters, and descends along the southern slope of these hills. By this descent the wind becomes compressed and heated so that it has something of the characteristics of the föhn wind as to heat and temperature. By drying up the sands and soil over which the wind blows it allows the particles that would otherwise be stuck together by moisture to separate from each other so that a great mass of dust is carried by the wind. The heavens are darkened and the sun is invisible. The leaves of the trees dry up and drop off on account of its warmth and the unusual quantity of bacteria causes flesh, milk, and other foods to spoil rapidly.

[However, this is not a föhn wind properly so called as the latter derives its extra heat from the latent heat set free by condensation of vapor, whereas the hot winds of Melbourne derive their extra heat from the hot, dry soil of the interior of Australia.—Ed.]

#### SHOWERS OF FISH.

Although for a century past numerous miscellaneous questions that are common among those who have not considered the subject carefully have been banished from meteorological treatises yet we find them cropping up everywhere in the classes of children devoted to nature study. In answer to an occasional correspondent it may be well to state in these columns that it is well established as highly probable that in some cases violent winds have swept up from shallow ponds and wet swamps not only the water and the leaves but also the smaller animals such as little fishes, tadpoles and frogs. In fact, in an early number of the *MONTHLY WEATHER REVIEW* will be found on record a case in which a small turtle was carried up and was coated with ice before it fell as the center of a hailstone. Heavy objects invariably come down soon and within a few miles, but such expressions as "a rain of toads", "a rain of fish" are exaggerations. The yellow pollen of the pine is often carried up in great quantity and descending forms a so-called "shower of sulphur". Sometimes the spores of fungi are brought down by the rain and grow so rapidly after the rain is over that the ground is covered with a reddish slime, sometimes called a "shower of blood". At other times great quantities of the spawn of frogs descending with the rain and gathering into the pools of water make a "shower of tadpoles". But the so-called "shower of frogs" and the "shower of angle worms" are not likely to be cases of this kind. The latter are often drowned out of their abodes in the soil and seek fresh air at the surface. We do not know that these showers of frogs and worms have been very carefully investigated by any naturalist, and the subject is not very important, but in general the study of such questions belong to natural history, not to meteorology.

#### HAWAIIAN CLIMATOLOGY.

For many years it has been the policy of the Weather Bureau to publish in the *MONTHLY WEATHER REVIEW* climatological data from different parts of the globe that were not likely to become otherwise accessible to the student of meteorology. Those interested in the climatology of Hawaii will notice that the tabular data from that territory is now restricted to the table of data for Honolulu. This is because the general monthly report of the Climate and Crop Section of Hawaii gives very full details and is printed in a sufficiently large edition to allow of furnishing copies to all who are especially interested in the subject. These may be had by direct application to the Section Director, U. S. Weather Bureau office, Honolulu, T. H.

#### SCIENTIFIC AERONAUTICS.

We have published some account of the action taken at the fourth conference of the International Committee for Scientific Ballooning which took place on the 9th of August, 1904, at St. Petersburg.

An official copy of the resolutions then adopted was forwarded to the United States Government through the Russian Ambassador on April 27, 1905, drawing attention to the necessity of an international organization for aerial sounding and asking whether the Government of the United States will contribute toward the printing of the publications.

The resolutions state that the sum expended for publication during the first three years was 30,000 francs or about \$6000, and that the same amount will probably be needed in the future. Up to the present time the expense has been defrayed by one of the countries, viz, Germany, but it is recommended that each country be invited to defray a share of the expense, receiving in return a corresponding number of copies of the publication. Private individuals are also free to contribute or subscribe.